

WHAT IS CLAIMED IS:

1. An etching solution suitable for etching a resin layer based on a polyimide, the solution comprising:

3 to 65% by weight alcohol;

10 to 55% by weight alkaline compound; and

0.75 to 3.0 times the weight of the alkali compound water, wherein the alcohol comprises at least one alcohol selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide.

2. An etching solution suitable for etching a resin layer based on a polyimide, the solution comprising:

3 to 65% by weight alcohol;

10 to 55% by weight alkaline compound; and

0.85 to 2.5 times the weight of the alkali compound water, wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide.

3. The etching solution of claim 1, wherein the alkali metal hydroxide comprises at least one compound selected from a group consisting of sodium hydroxide, potassium hydroxide and lithium hydroxide.

4. The etching solution of claim 2, wherein the alkali metal hydroxide comprises at least one compound selected from

a group consisting of sodium hydroxide, potassium hydroxide and lithium hydroxide.

5. The etching solution of claim 1, wherein the quaternary ammonium hydroxide comprises at least one selected from the group consisting of tetramethylammonium hydroxide and tetraethylammonium hydroxide.

6. The etching solution of claim 2, wherein the quaternary ammonium hydroxide comprises at least one selected from the group consisting of tetramethylammonium hydroxide and tetraethylammonium hydroxide.

7. The etching solution of claim 1, wherein the diol comprises at least one diol selected from a group consisting of 1,3-propanediol, 2,3-butanediol, 1,4-butanediol and 1,5-pentanediol.

8. The etching solution of claim 2, wherein the diol comprises at least one diol selected from a group consisting of 1,3-propanediol, 2,3-butanediol, 1,4-butanediol and 1,5-pentanediol.

9. A method for etching a resin layer, comprising:
forming a film-like resin layer based on a polyimide having an imidation degree of from 50 to 98 %;

providing a resist layer having an opening at a desired position on a surface of the resin layer; and

bringing an etching solution at 65 °C or more into contact with the resin layer located at a bottom of the opening to etch the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of 0.75 to 3.0 times a

weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide.

10. A method for etching a resin layer, comprising:
forming a film-like resin layer based on a polyimide having an imidation degree of from 50 to 98 %;
providing a resist layer having an opening at a desired position on the surface of the resin layer; and
bringing an etching solution at 65 °C or more into contact with the resin layer located at a bottom of the opening to etch the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of from 0.85 to 2.5 times the weight of the alkali compound and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide.

11. The method of claim 9, wherein forming a film-like resin layer comprises heating a precursor layer based on a polyimide resin having an imidation degree of less than 50 %.

12. The method of claim 10, wherein forming a film-like resin layer comprises heating a precursor layer based on a polyimide resin having an imidation degree of less than 50 %.

13. The method of claim 9 wherein forming a film-like resin layer comprises applying a coating solution; and drying the coating solution containing a polyimide having an imidation degree of from 50 to 98 % on a substrate.

14. The method of claim 10, wherein forming a film-like resin layer comprises applying a coating solution; and drying the coating solution containing a polyimide having an imidation degree of from 50 to 98 % on a substrate.

15. A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide precursor on a side of a substrate having at least a metal wiring on which the metal wiring is provided;

drying the coating solution to form a precursor layer based on a polyimide having an imidation degree of less than 50 %;

heating the precursor layer to form a polyimide resin layer having an imidation degree of from 50 to 98 %;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a desired shape to form an opening;

preparing an etching solution comprising 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of from 0.75 to 3.0 times a weight of the alkali compound and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6

carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide; and

bringing the etching solution at 65 °C or more into
5 contact with the resin layer located at a bottom of the opening to etch the resin layer.

16. A method for manufacturing a flexible wiring board comprising:

10 applying a coating solution containing a polyimide precursor on a surface of a metal foil;

drying the coating solution to form a precursor layer based on a polyimide having an imidation degree of less than 50 %;

heating the precursor layer to form a polyimide resin layer having an imidation degree of from 50 to 98 %;

applying a resist layer coating solution on the surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a desired shape to form an opening;

preparing an etching solution comprising 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound, and
25 water in a weight of from 0.75 to 3.0 times the weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at
30 least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide;

bringing the etching solution at 65 °C or more into contact with the resin layer located at a bottom of the

opening to etch the resin layer;

and providing a resist layer having an opening at a desired position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil exposed at the bottom of the opening in the resist layer.

17. A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide having an imidation degree of from 50 to 98 % on the side of a substrate having at least a metal wiring on which the metal wiring is provided;

drying the coating solution to form a resin layer

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a desired shape to form an opening;

preparing an etching solution comprising 3 to 65% by weight of alcohol , 10 to 55% by weight of alkali compound , and water in a weight of from 0.75 to 3.0 times a weight of the alkali compound, wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide; and

bringing the etching solution at 65 °C or more into contact with the resin layer located at a bottom of the opening to etch the resin layer.

18. A method for manufacturing a flexible wiring board

comprising

applying a coating solution containing a polyimide having an imidation degree of from 50 to 98 % on a surface of a metal foil;

5 drying the coating solution to form a resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating to form a resist layer;

10 patterning the resist layer in a desired shape to form an opening;

00005656.071204
20 preparing an etching solution comprising 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound, and water in a weight of from 0.75 to 3.0 times a weight of the alkali compound wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide;

bringing the etching solution at 65 °C or more into contact with the resin layer located at the bottom of the opening to etch the resin layer; and

providing a resist layer having an opening at a desired position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil
25 exposed at a bottom of the opening in the resist layer.